

***FlyBy Math™* Alignment**  
**Core Curriculum Content Standards for**  
**Mathematics**

**STANDARD 4.3 PATTERNS AND ALGEBRA**

All students will represent and analyze relationships among variable quantities and solve problems involving patterns, functions, and algebraic concepts and processes.

**Strand 4.3.12 B. Functions & Relationships**

**Cumulative Progress Indicators**

1. Understand relations and functions and select, convert flexibly among, and use various representations for them, including equations or inequalities, tables, and graphs.

***FlyBy Math™* Activities**

- Represent distance, speed, and time relationship for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.
- Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to draw conclusions.

**Strand 4.3.12 C. Modeling**

**Cumulative Progress Indicators**

1. Use functions to model real-world phenomena and solve problems that involve varying quantities.
  - Linear, quadratic, exponential, periodic (sine and cosine), and step functions (e.g., price of mailing a first-class letter over the past 200 years)
  - Direct and inverse variation
  - Absolute value
  - Expressions, equations and inequalities
  - Same function can model variety of phenomena
  - Growth/decay and change in the natural world
  - Applications in mathematics, biology, and economics (including compound interest)
2. Use patterns, relations, symbolic algebra, and linear functions to model situations.
  - Using manipulatives, tables, graphs, verbal rules, algebraic expressions/equations/
  - Growth situations, such as population growth and compound interest, using recursive (e.g., NOW-NEXT) formulas (cf. science standard 5.5 and social studies standard 6.6)

***FlyBy Math™* Activities**

- Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.
- Represent distance, speed, and time relationship for constant speed cases linear equations, and a Cartesian coordinate system.
- Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.
- Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.
- Represent distance, speed, and time relationship for constant speed cases linear equations, and a Cartesian coordinate system.
- Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.

## STANDARD 4.5 MATHEMATICAL PROCESSES

All students will use mathematical processes of problem solving, communication, connections, reasoning, representations, and technology to solve problems and communicate mathematical ideas.

### Strand 4.5 A. Problem Solving

Cumulative Progress Indicators	<i>FlyBy Math™</i> Activities
1. Learn mathematics through problem solving, inquiry, and discovery.	--Conduct simulation and measurement for several aircraft conflict problems.  --Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.
2. Solve problems that arise in mathematics and in other contexts. <ul style="list-style-type: none"><li>• Open-ended problems</li><li>• Non-routine problems</li><li>• Problems with multiple solutions</li><li>• Problems that can be solved in several ways</li></ul>	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios  --Use tables, graphs, and equations to solve aircraft conflict problems.
3. Select and apply a variety of appropriate problem-solving strategies (e.g., “try a simpler problem” or “make a diagram”) to solve problems.	--Use tables, graphs, and equations to solve aircraft conflict problems.
5. Monitor their progress and reflect on the process of their problem solving activity.	--Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.

### Strand 4.5 B. Communication

Cumulative Progress Indicators	<i>FlyBy Math™</i> Activities
2. Communicate mathematical thinking coherently and clearly to peers, teachers, and others, both orally and in writing.	--Predict outcomes and explain results of mathematical models and experiments.  --Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.
4. Use the language of mathematics to express mathematical ideas precisely.	--Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.  --Predict outcomes and explain results of mathematical models and experiments.

### Strand 4.5 C. Connections

Cumulative Progress Indicators	<i>FlyBy Math™</i> Activities
3. Recognize that mathematics is used in a variety of contexts outside of mathematics.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.

4. Apply mathematics in practical situations and in other disciplines.	--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios.
<b>Strand 4.5 E. Representations</b>	
<b>Cumulative Progress Indicators</b>	<b><i>FlyBy Math™</i> Activities</b>
1. Create and use representations to organize, record, and communicate mathematical ideas. <ul style="list-style-type: none"> <li>• Pictorial representations (e.g., diagrams, charts, or tables)</li> <li>• Symbolic representations (e.g., a formula)</li> <li>• Graphical representations (e.g., a line graph)</li> </ul>	--Represent distance, speed, and time relationship for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system.
2. Select, apply, and translate among mathematical representations to solve problems.	--Choose among tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.
3. Use representations to model and interpret physical, social, and mathematical phenomena.	--Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes.